

## ABSTRACT

An object oriented multi-protocol, multi-command system and method for securely downloading firmware to storage devices in client-server architecture integrated with management and configuration. The system

5 includes an agent manager to manage agents running on the server and an applet manager to manage applets running on the client. The object-oriented modular applet design with well defined interfaces between modules and layered protocols enable use of common GUI device module across controllers and adapters. The agent manager keeps track of agents using register, un-

10 register features, and optionally polling agents. It services clients using single known port minimizing the need to keep track of one known port for each agent. The services could be centralized through the agent manager or decentralized with applet-agent pairs or a hybrid. Several layers of security are provided in the system in managing and downloading firmware to devices.

15 A firmware file is created with firmware image and data header having security, protection, and device characteristic information. The firmware download can happen in network or non-networked environment supporting multiple protocols and command sets. The system supports devices having varying characteristics and simultaneous multiple segmented firmware

20 download to devices across subsystems and servers. Load sharing distributed Asynchronous Event Servers (AESs) provided event notifications to users. The Primary and secondary AESs increase reliability of event notification.